

(12) PETTY PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. AU 199895215 B3
(10) Patent No. 708967

(54) Title
Cast-In fastenings for use in concrete components

(51)⁶ International Patent Classification(s)
E04B 001/41 E04G 015/04

(21) Application No: 199895215

(22) Application Date: 1998.12.03

(30) Priority Data

(31) Number	(32) Date	(33) Country
PP0810	1997.12.09	AU

(43) Publication Date : 1999.08.19

(43) Publication Journal Date : 1999.08.19

(45) Granted Journal Date : 1999.08.19

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(56) Related Art
US 5205690
AU 50732/90
DE 19653985

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A B S T R A C T

A stand for supporting a fastening to be cast into a concrete component, said stand comprising a base for supporting the fastening from below, and a group of fastening supports each individually locatable on the base, each said support defining a vertical passage for receiving and centring the fastening above the base and each said support being attachable to the base by a coupling which resists unintentional separation of the support from the base during casting, the group of supports including supports having passages of different diameter whereby a respective one of the supports having a passage diameter appropriate to the particular fastening being used can be selected and applied to the base.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A stand for supporting a fastening to be cast into a concrete component, said stand comprising a base for supporting the fastening from below, and a group of fastening supports
5 each individually locatable on the base, each said support defining a vertical passage for receiving and centring the fastening above the base and each said support being attachable to the base by a coupling which resists unintentional separation of the support from the base during casting, the group of supports including supports having passages of different diameter whereby a respective one of the supports having a passage diameter appropriate to the
10 particular fastening being used can be selected and applied to the base.

2. A stand according to claim 1, wherein each said support comprises an upper ring within which the fastening is centred, and depending legs, the lower end portions of the legs being engageable with the base and being attached to the base by said coupling.
15

3. A stand according to claim 2, wherein in each of said supports, the depending legs of each said support have at their lower ends foot pads, and the coupling is a snap-action coupling on the base to engage with the foot pads.
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DATED this 3rd day of December, 1998

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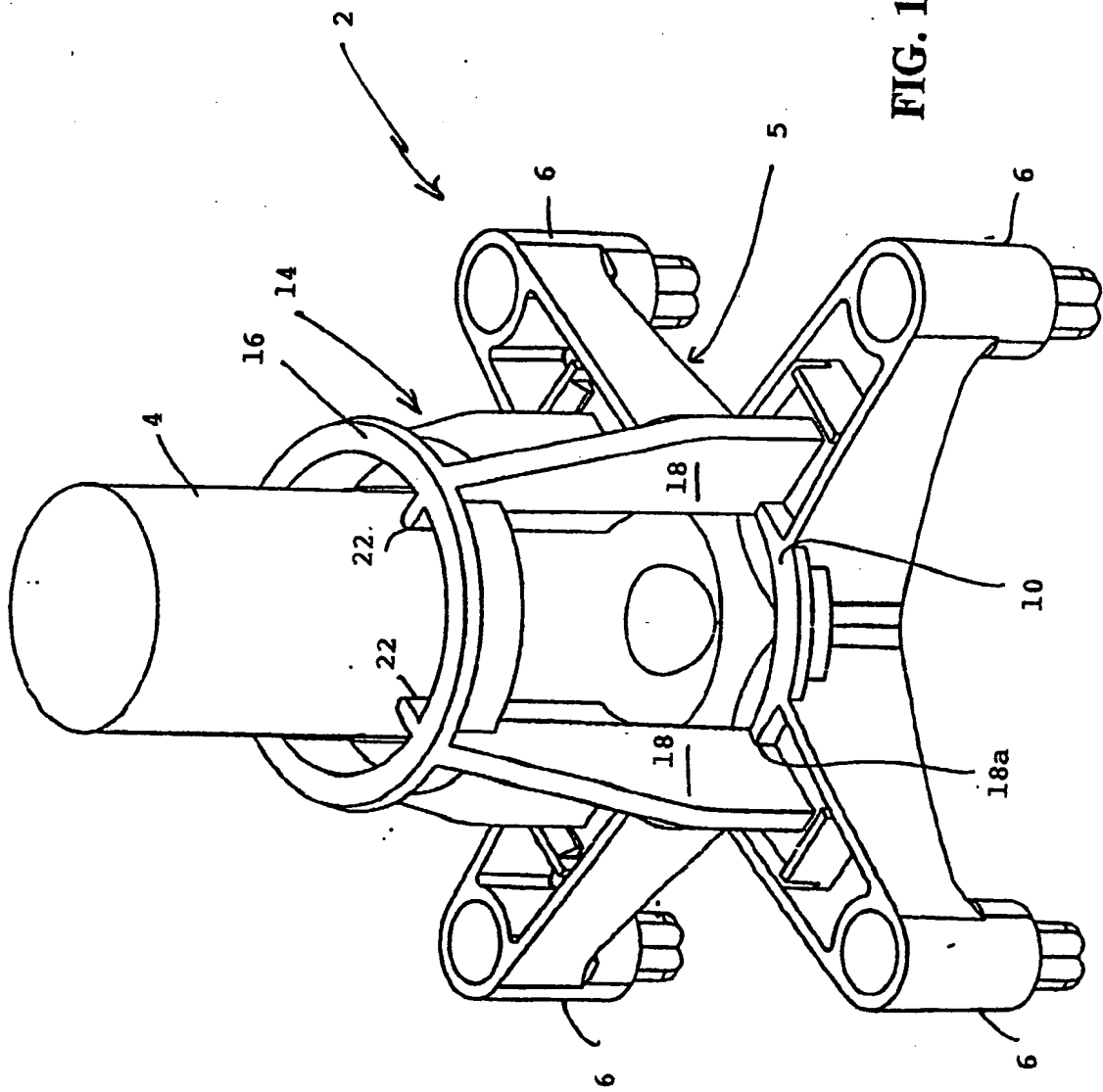


FIG. 1

AUSTRALIA
PATENTS ACT 1990
COMPLETE SPECIFICATION
FOR A STANDARD PETTY PATENT
(ORIGINAL)

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Invention Title: **"Cast-in fastenings for use in concrete components"**

Details of Associated Provisional Application(s) No(s):

PP0810/97 filed 9 December, 1997

The following statement is a full description of this invention, including the best method of performing it known to us:

CAST-IN FASTENINGS FOR USE IN CONCRETE COMPONENTS

The present invention relates to cast-in fastenings for use in concrete components and more particularly to stands for cast-in fastenings such as ferrules or lifting anchors.

5

In the fabrication of concrete components such as panels, slabs, and beams it is sometimes necessary to incorporate as part of the structure fastenings, for example for use as an attachment point or to facilitate lifting of the concrete component as part of the construction process; examples of such fastenings include an internally-threaded ferrule for
10 receiving a fastening bolt, or a lifting anchor for attachment to a clutch of a lifting system. Such fastenings are typically incorporated into the structure prior to casting of the concrete so that they are embedded within the concrete. To incorporate the fastening, the fastening is supported on a stand which rests on the surface on which the concrete component is being cast. The stand must support the fastening so that the upper end of the fastening will lie at
15 a height corresponding to the upper surface of the concrete component being cast. Hitherto, it has been conventional practice to accommodate different depths of the finished concrete component by using stands of different height and/or fastenings of different length. However as fastenings are provided in a range of different diameters this can require a large stock-holding of stands of different diameter and possibly also of different height or otherwise a
20 large stock-holding of fastenings of different length and diameter.

According to the present invention, there is provided a stand for supporting a fastening to be cast into a concrete component, said stand comprising a base for supporting the fastening from below, and a group of fastening supports each individually locatable on the
25 base, each said support defining a vertical passage for receiving and centring the fastening above the base and each said support being attachable to the base by a coupling which resists unintentional separation of the support from the base during casting, the group of supports including supports having passages of different diameter whereby a respective one of the supports having a passage diameter appropriate to the particular fastening being used can be
30 selected and applied to the base.

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There may also be provided a range of bases to support the fastening at different heights above a surface on which the stand rests and which forms lower formwork for the component being cast.

5 The supports defined above may also be used independently of the base to support a fastening directly from underlying formwork. This may be required when the fastening is in the form of a ferrule supported in inverted configuration from the underlying formwork. For this purpose the supports may be nailed directly to the underlying formwork.

10 In a preferred embodiment, each support comprises an upper ring within which the fastening is centred and depending legs, the lower end portions of which engage with the base. Preferably, the lower end portions of the legs engage with the base with a snap action when the fastening has been assembled to the base or to the support. In one particularly preferred form the depending legs carry at their lower end foot pads which engage in snap-in
15 engagement in correspondingly shaped recesses in the base. In this form when the support is used independently of the base to support the fastening directly from underlying formwork the support can be secured to the formwork by nailing through the foot pads.

According to another aspect of the invention, there is provided a stand for supporting
20 a fastening to be cast into a concrete component, said fastening comprising a plate-like member with a threaded aperture, said stand comprising a base for supporting the fastening from below, and a support locatable on the base, said support defining a vertical passage for receiving and centring a tubular void former above the threaded aperture to provide access to the threaded aperture after casting, said support means being attachable to the base.

25

In a preferred embodiment the support used in this aspect of the invention is as defined previously.

Preferably, the base includes a surface for supporting the plate-like member, the
30 surface including a recess adapted to align with the threaded aperture in the member. In use,

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the threaded aperture in the member is intended to receive reinforcing bar threaded at its end portion, with the threaded end portion of the bar extending through the threaded aperture into the recess.

5 Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a stand or chair in accordance with a preferred embodiment of the invention in its assembled state;

Figure 2 is a perspective view of a base of the stand;

10 Figure 3 is a perspective view from underneath of the base;

Figure 4 is a perspective view of a support member attachable to the base;

Figure 5 illustrates schematically a range of such support members having support passages of different internal diameters;

Figure 6 is a perspective view illustrating the manner in which the support member
15 can be used independently of the base; and

Figure 7 is a perspective view of a modified form of stand base.

In accordance with a preferred embodiment of the invention, a stand or chair 2 for supporting a fastening 4 such as an internally-threaded ferrule or a lifting anchor comprises
20 a base 5 having legs 6 arranged around a solid support 8 which is spaced upwardly from the lower ends of the legs 6. The solid support 8 is defined within a ring 10. In the embodiment shown the base 5 has four legs 6, although in alternative embodiments there may only be three legs. The base 5 is preferably moulded in one piece from suitable plastics material, and the underneath profile of the base 5 is such as to provide clearance for flow of concrete
25 beneath the underside of the base. The solid support 8 on which the fastening 4 rests provides so-called "cover" between the lower end of the fastening 4 and the adjacent surface of the concrete component in accordance with the requirements of the relevant Australian standard.

30 Each of the legs 6 has in its upper surface a recess 12 of flat-bottomed shape to receive

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and locate a support member 14 (see in particular Figures 1 and 4) which is fitted onto the base 5 to support and hold the upper part of the fastening 4 centrally relative to the base 5. As shown, the support member 14 comprises an upper ring 16 from which depends four legs 18 each of which has at its lower end a foot pad 20 which is located in a respective one of the 5 flat-bottomed recesses 12 in the base 5. Each leg 18 carries at least in its upper part a radially-projecting rib 22 which is continued upwardly onto the inner surface of the upper ring 16. The ribs 22 define, through the support member 14, a vertical passage having a diameter equivalent to the outer diameter of the fastening 4 in order to support and locate the fastening 4 whereby the fastening 4 is held centrally relative to the base 5, the axial length of the ribs 10 22 being sufficient to ensure the lateral stability of the fastening 4. In this way, the fastening 4 will be securely held at right angles to the base 5 and will remain in that configuration during casting. The support member 14 is preferably moulded in one piece from suitable plastics material.

15 Preferably, the foot pads 20 of the support member 14 are fitted into the recesses 12 in the base 5 by a snap-in action in such a way as to prevent de-coupling, or at least to permit de-coupling only with difficulty. In the form shown, the snap-action fastening is achieved by making one of the walls of the recess 12, as shown the wall 12a which is opposite the ring 10, as a resiliently deflectable wall having a locking lug 12b which snaps in over the foot pad 20 20 when the foot pad 20 is inserted into the recess 12. It is, however, to be understood that other configurations which achieve a locking effect of the foot pad 20 within the recess 12 could alternatively be used, as could other means for coupling the legs of the support member to the base. The outer surface of the ring 10 within the zone of each recess 12 is flattened and this co-operates with a step 18a formed at the lower end portion of the leg 18 so that 25 when the support member 14 is fitted to the base 5 by engagement of the foot pads 20 within the recesses 12 the steps 18a at the lower ends of the legs 18 will engage against the outer surface and upper surface of the ring 10. Thus, in the assembled condition there is co-operation between the base 5 and the upstanding support member 14 which acts to rigidify both the base 5 and support member 14.

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Prior to assembling the support member 14 to the base 5 the fastening 4 is either mounted on the base 5 or within the support member 14 and then the support member 14 is applied to the base 5 in the manner described so that it is secured thereto by the snap-in engagement of the lugs 12b over the foot pads 20 and when so engaged the support member 14 will be locked securely thereto sufficient to resist displacement during casting of the concrete.

As shown, the outer portions of the legs 6 of the base 5 are of vertically open structure consisting of tubular portions 6a at their upper ends with foot portions 6b at their lower ends of cruciform or other open structure which open into the tubular portions 6a to permit concrete to flow downwardly through these portions of the legs during casting. Alternatively, the outer portions of the legs 6 may be closed at the junction of foot portions 6b. Also the foot portions 6b are, as shown, of a smaller diameter than that of the tubular portions 6a whereby a group of bases 5 can be stored in stacked relationship with the foot portions 6b of one base 5 located in the tubular portions 6a of the legs of an adjacent lower base 5.

To accommodate a range of fasteners of different diameter, a range of upstanding support members (14(i) to 14(iv) - Fig. 5) are provided which differ only in the internal diameter of the passage defined by the inwardly-projecting ribs 22 and to accommodate different depths of the finished concrete component, a range of bases 5 may be provided in a range of different heights as defined by the vertical length of the outer portions (6a, 6b) of their legs. It is envisaged that for most practical applications a range of no more than three different base heights will be required and a range of perhaps four support members of different diameter will be required. Instead of providing depth adjustment by producing a range of bases of different vertical leg length, this may be achieved by the incorporation of optional height-adjustment inserts within the ring 10 of the base to provide a support for the lower end of the fastening raised from the base.

In addition to its function as a support in conjunction with the base 5, the support member 14 can also be used independently of the base 5 to centre and support an inverted

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ferrule 4a against underlying formwork. For this purpose, the support member 14 can be fastened directly to the underlying formwork by nailing or gluing through the foot pads 20. Figure 6 illustrates the support member when used in this mode.

- 5 In the embodiment of Figure 7 there is shown a base 5 which differs from that of Figures 1 to 3 in that instead of defining the solid support 8 within a ring of substantially circular form it is defined within an upstanding wall 50 of polygonal shape. Depending on the intended use of the stand 2, the support 8 of the base 5 can either consist of an uninterrupted planar surface or a surface with a central cylindrical recess 8a as shown in
- 10 Figure 7. When the base 5 is produced with the support surface 8 uninterrupted, it is used in conjunction with a support member 14 as previously described to support a ferrule, lifting anchor, or other fastening also as previously described.

The alternative form, in which the support surface 8 includes the central cylindrical

15 recess 8a which projects downwardly from the support surface 8 and is closed at its lower end, is used in conjunction with an anchoring plate which fits within the upstanding wall 50, the peripheral shape of the plate corresponding to the peripheral shape of the upstanding wall 50 so that the plate cannot rotate within the base. When positioned on the support surface 8 a threaded aperture in the anchoring plate overlies the cylindrical recess 8a. In this mode,

20 the base 5 and support member 14 support a tubular void former which rests on the surface of the anchoring plate and is supported and located by the support member 14 in the same manner that the support member locates a ferrule or other fastening. When used in this mode the base 5 is able to locate deep within the concrete component the threaded anchoring plate, access to which is afforded through the passage defined by the tubular void former after

25 casting. In this way, threaded reinforcing rod can be inserted into the concrete component through the passage to be coupled with the threaded aperture in the anchoring plate, the threaded end portion of the rod passing through the entire thickness of the anchoring plate so as to lie within the cylindrical recess 8a and in this way it is ensured that a secure coupling is formed between the reinforcement and anchoring plate.

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The same mould can be used to produce the base 5 either with or without the cylindrical recess 8a. When the recess 8a is required, a removable insert is incorporated into the mould.

- 5 Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise", or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.
- 10 The embodiments have been described by way of example only and modifications are possible within the scope of the invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A stand for supporting a fastening to be cast into a concrete component, said stand comprising a base for supporting the fastening from below, and a group of fastening supports
5 each individually locatable on the base, each said support defining a vertical passage for receiving and centring the fastening above the base and each said support being attachable to the base by a coupling which resists unintentional separation of the support from the base during casting, the group of supports including supports having passages of different diameter whereby a respective one of the supports having a passage diameter appropriate to the
10 particular fastening being used can be selected and applied to the base.

2. A stand according to claim 1, wherein each said support comprises an upper ring within which the fastening is centred, and depending legs, the lower end portions of the legs being engageable with the base and being attached to the base by said coupling.
15

3. A stand according to claim 2, wherein in each of said supports, the depending legs of each said support have at their lower ends foot pads, and the coupling is a snap-action coupling on the base to engage with the foot pads.
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DATED this 3rd day of December, 1998

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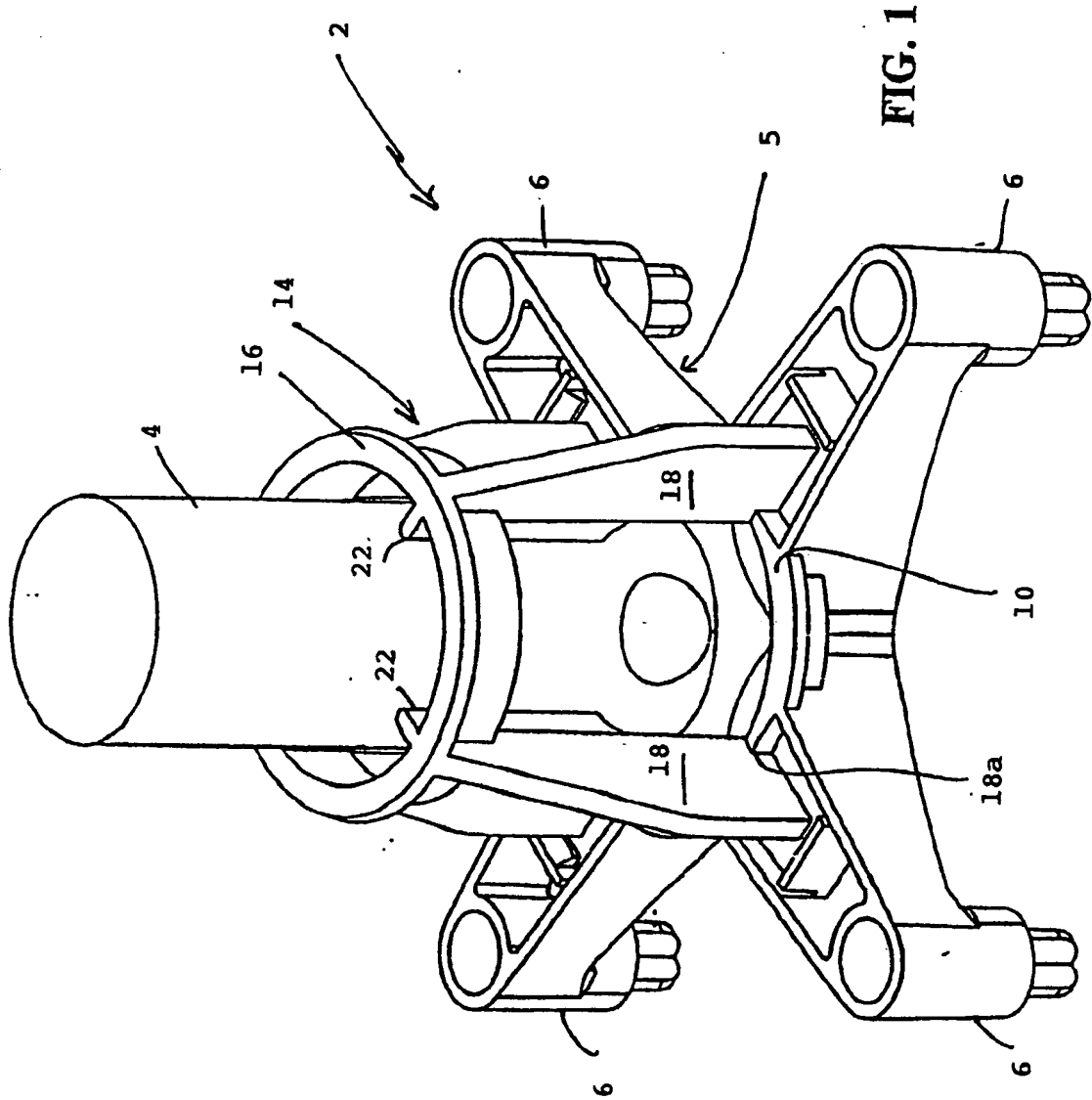




FIG. 2

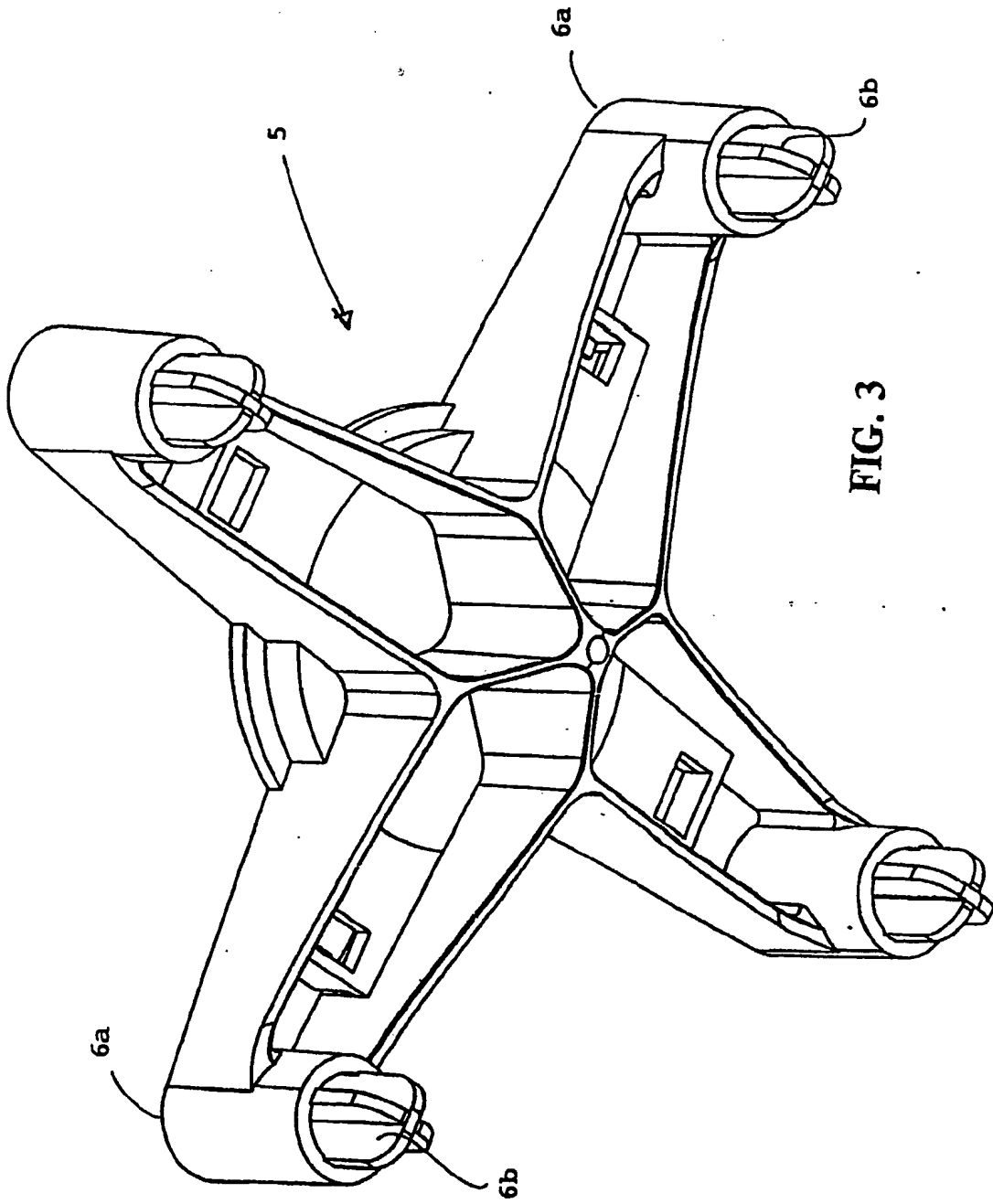
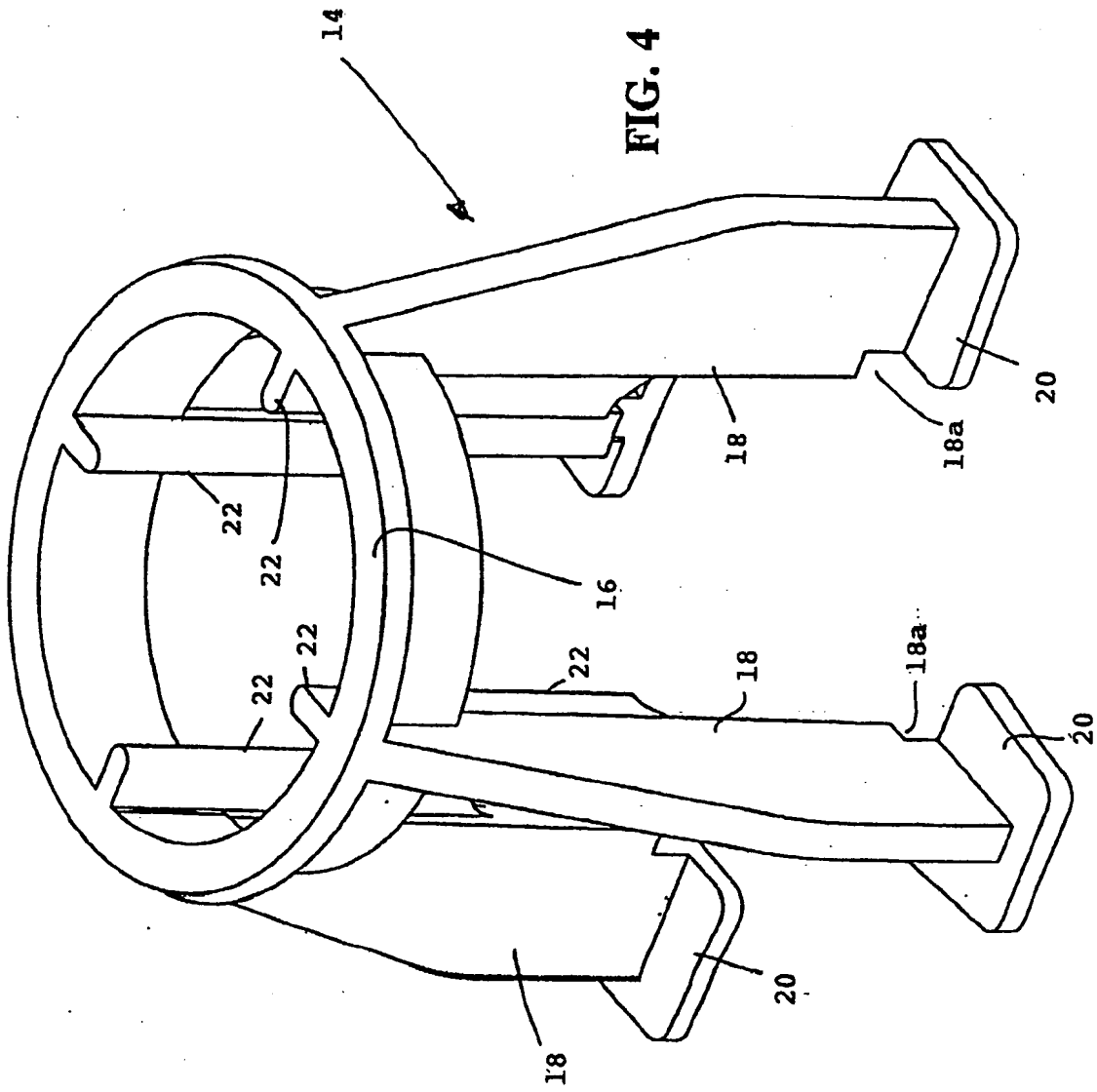
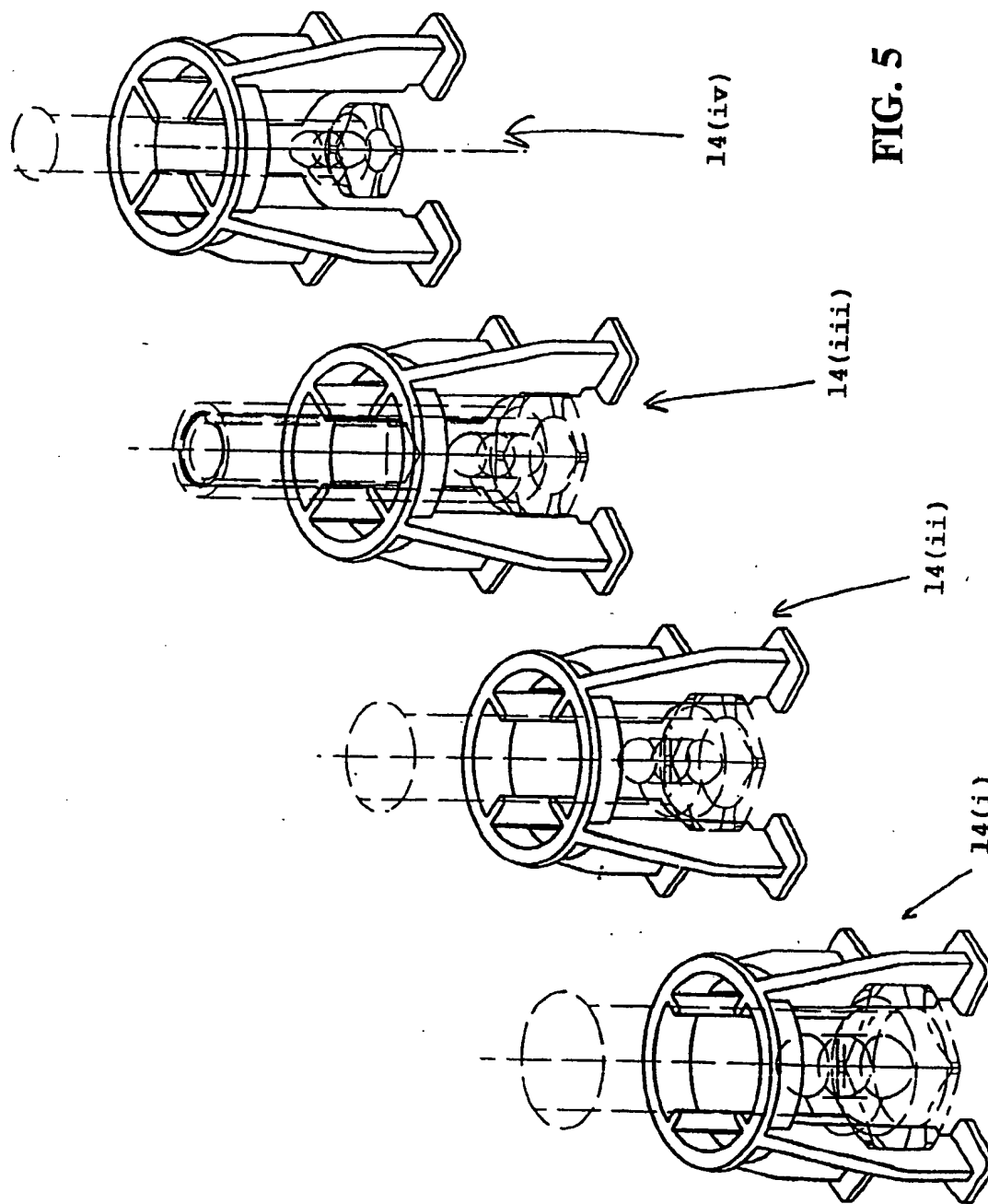


FIG. 3





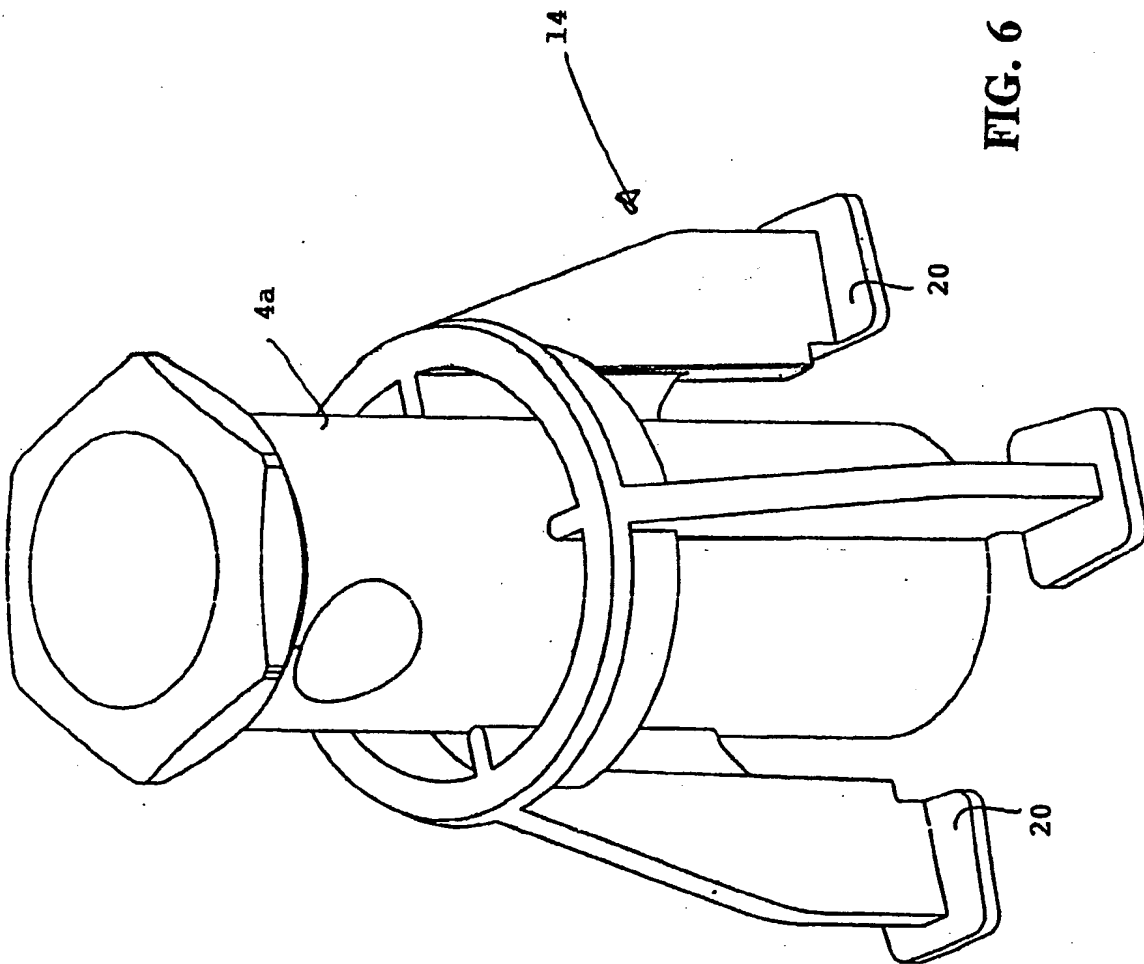


FIG. 6

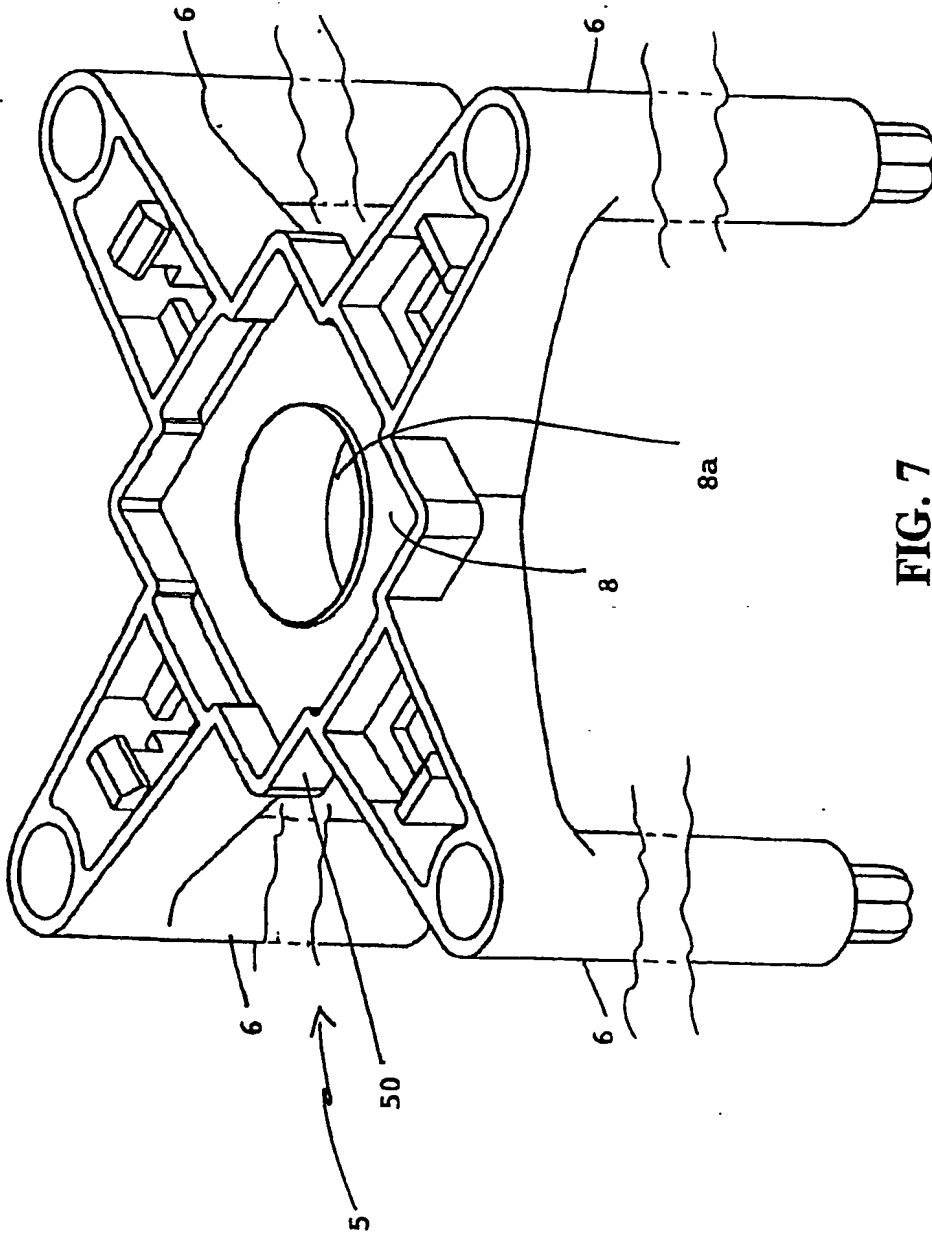


FIG. 7

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